

ARCHIVED REPORT

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Antonov An-148

Outlook

- The Russian invasion of Ukraine in February 2022 placed the future of the An-148 program in doubt
- Production of a handful of An-178 transport variants for the governments of Peru and Ukraine has likely been suspended

Orientation

Description. Twin-turbofan, high-wing regional jet.

Sponsor. Antonov Aeronautical Scientific-Technical Complex; Aviant Kiev State Aviation Plant; Voronezh Aviation Production Association (VASO).

Status. Production status uncertain due to Russia's invasion of Ukraine in February 2022

Total Produced. Approximately 36 An-148s, six An-158s, and one An-178 were produced through December 2022, including test aircraft.

Application. Short/medium-range regional transport and military transport/freighter.

Price Range. An-148 estimated at \$34.7 million, An-178 at \$42.8 million.



An-148 Regional Airliner

Source: Antonov

Antonov An-148**Contractors****Prime**

Antonov Company	http://www.antonov.com , 1, Tupolev St, Kyiv, Ukraine, Tel: + 380 44 400 97 96, Email: info@antonov.com , Prime
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Subcontractor

Motor Sich JSC/Progress (ZMKB)	http://www.motorsich.com , 2, Ivanova St, Zaporozhye, Ukraine, Tel: + 380 612 650327, Fax: + 380 612 654697 (D436-148 Engine)
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Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 75 Glen Road, Suite 302, Sandy Hook, CT 06482, USA; rich.pettibone@forecast1.com

Technical Data

(An-178)

	<u>Metric</u>	<u>U.S.</u>
Dimensions		
Length	32.2 m	105.6 ft
Height	9.6 m	31.5 ft
Wingspan	30.6 m	100.4 ft
Weight		
Max TOW (standard variant)	51,000 kg	112,435 lb
Max Payload	18,000 kg	39,683 lb
Performance		
Economical Cruising Speed	825 km/h	445 kt
Range with Cargo	3,680 km	1,987 nm
Propulsion		
An-148	(2)	MKB Progress D436-148 engines rated 65.6 kN (14,740 lbst).
An-158	(2)	MKB Progress D436-148 engines rated 67 kN (15,000 lbst).
An-178	(2)	MKB Progress D436-148FM engines rated 70.0 kN (15,736 lbst).

Typical Seating

An-148: 68 passengers in a dual-class layout and 75 passengers in a single class (32-in pitch).

An-158: 89 passengers in a dual-class layout and 99 passengers in a single class.

Variants/Upgrades

An-148-100A. Short-haul model. Configured for 75 passengers, it has a range of 2,200 kilometers (1,187 nm).

An-148-100B. Baseline model.

An-148-100C. Cargo variant with side cargo door.

An-148-100E. Version with English language cockpit and higher maximum takeoff weight of 43,700 kilograms (96,341 lb). Max payload range

increased from 3,500 kilometers (1,890 nm) to 4,400 kilometers (2,375 nm).

An-148-100EM. A special purpose variant designed for medical evacuation missions.

An-148-201. Stretched fuselage variant of the -100 that increases maximum capacity to 89 passengers.

An-158-100. Stretched version capable of carrying 99 passengers. Extended by using fuselage plugs ahead

Antonov An-148

and aft of the wings. First flight in April 2010. The fuselage is extended by 1.7 meters (5.5 ft). Winglets (not available on the An-148) give the An-158 about 8.5 percent better fuel efficiency in typical service, according to Antonov. Deliveries to launch customer Cubana began in April 2013.

An-178. Civil freighter/military transport variant derived from the An-158. The two models have identical flight decks and wing panels and many common onboard systems, but the fuselage of the An-178 is 0.65 meters (2.1 ft) wider. It is also equipped with a ramp at the rear of the aircraft. Launched in 2010, this variant made its first flight in 2015.

Program Review

Background. In September 2001, Antonov announced the development of a family of medium-range, 75-99 seat regional jets. Antonov selected a high-wing design for the An-148 family to make it suitable for operations from unprepared or rough runways, a feature that would appeal to certain operators in Africa and Asia as well as remote regions of Russia.

The design featured Russian and Ukrainian avionics and a Ukrainian-made Motor Sich Progress D436-148 engine. A 2005 production-sharing agreement made Russian enterprises responsible for producing nearly 70 percent of aircraft components and Ukrainian enterprises the remaining content. The Aviant aircraft-building plant in Kyiv is the primary production facility, with licensed production taking place at the Voronezh Aircraft Plant (*Voronezhskoye Aktsionernoye Samoletostroitelnoye Obshestvo*, or VASO) in Voronezh, Russia.

Antonov and its partners used a Western-style shared-risk model to fund and develop the aircraft. Ilyushin Finance Company, a Russian leasing company, provided some financial backing and is responsible for marketing and sales of the An-148 throughout the Commonwealth of Independent States (CIS). At the same time, ILF, Antonov, Aviant, and VASO agreed to adopt an aftersales support model designed after Western practices in which the contractors, and not the financing enterprise, are responsible for providing component and service support. In addition, Russia's United Aircraft Corporation provided funding for renovations of the VASO production facility required for production of the An-148.

The An-148 made its maiden flight in December 2004. Antonov received a Russian AP-25 airworthiness certificate for the An-148 in February 2007. At the same time, it also received type certification for the aircraft from Ukraine.

Antonov developed a stretched model, the An-158, using an existing An-148 airframe. The prototype made its first flight in April 2010 and achieved Russian certification in February 2011.

The reliability of the An-148 in commercial service was initially very poor. Rossiya openly criticized the An-148's reliability in the fall of 2010, with a technical failure in flight once every 344 hours during the first three months of service, compared with one failure in every 2,824 hours of flight for its fleet of Boeing 737s. Problem areas include the aircraft's engines, undercarriage, electrical supply system, flight control system, auxiliary power unit (APU), and door locks.

An An-148 destined for Myanmar crashed in March 2011 during a training/familiarization flight while simulating an emergency descent maneuver. The aircraft's speed indicator malfunctioned, which led the crew to exceed the aircraft's maximum speed, causing what was reported to be an inflight breakup. Myanmar canceled its order after the crash.

Russian carriers have made up the bulk of orders for the An-148, but Russia's invasion of the Crimean region and its ongoing support of Ukrainian rebels in the eastern part of the country hurt the program. Both Aviant and VASO maintained final assembly lines until 2018, when Russian production shut down after all the aircraft ordered by the Russian Ministry of Defense were completed and before relations between Russia and Ukraine broke down. VASO's participation ended in 2018.

Production of the aircraft's engines was shared between Russia's Salyut and UMPO and Ukraine's Motor Sich (the An-158 is assembled only in Kyiv), but presumably this cooperation has also ended.

The An-178 freighter/military transport variant made its first flight in May 2015. The aircraft needs more powerful engines than the D-436-148FM that will power the An-178 at certification, but transitioning to a new engine will require funding that Antonov has not secured.

Saratov Airlines Crash

In February 2018, an An-148 operated by Saratov Airlines crashed soon after departure from Moscow. Initial reports indicated that the pilots failed to activate the aircraft's pitot-static tube heating system during flight in Instrument Flight Rule (IFR) conditions. Icing

Antonov An-148

on the pitot systems could have led to unreliable airspeed data that forced the pilots to operate the controls manually. A loss of aircraft control followed. Saratov later lost its operating certificate and folded.

Another airline customer, Cubana, acquired six An-158s during 2013-2015. The airline later stored all six

aircraft due to a lack of spare parts. By the end of 2021, the An-148 remained in commercial service with only a small number of airlines, including North Korea's Air Koryo, Russian carrier Angara Airlines, and a new Ukrainian start-up, Air Ocean Airlines.

Funding

Antonov's development costs are estimated at \$400 million. In September 2010, UAC said it was investing \$232 million in development and production of the An-148 at its Irkut subsidiary.

Worldwide Distribution/Inventories

Operator	Designation	Quantity
Air Koryo (North Korea)	An-148-100B	2
Air Ocean Airlines	An-148-100B	2
Angara Airlines*	An-148-100E	5
Antonov Airlines	An-148-100B	4
Russia Federal Security Bureau	An-148-100EA	4
Rossiya – Special Flight Detachment (Pres. Flight)	An-148-100EA	2
Russian Ministry of Emergencies	An-148-100EM	2
Russian Ministry of Defense	An-148	10
Ukraine Government	An-148-100B	1

* Includes two aircraft formerly operated by Polyot.

Forecast Rationale

The An-148 program was developed as a cooperative venture of industrial entities within Ukraine and Russia, but deteriorating relations between the Russian and Ukrainian governments left the program on life support even before the Russian invasion of Ukraine in February 2022.

We have suspended forecasting production of new aircraft from Antonov due to the uncertainty surrounding the status of its production facilities in Ukraine. We expected only a handful of deliveries from Antonov even before the invasion, and the conflict may finally kill the An-148 program altogether.

The An-148/158 family is in service with only three airlines: North Korea's Air Koryo, Russian carrier Angara Airlines, and a new Ukrainian start-up, Air Ocean. The remaining aircraft in the worldwide fleet serve with the Russian government and Air Force. The government of Ukraine also flies a single An-148.

Production of the baseline An-148 appears to have ended. A fatal crash of an An-148 operated by Saratov in February 2018 led to the end of the airline, with its aircraft presumably now available to other operators. That reduces demand for new aircraft below the already low level caused by Antonov's failure to properly support the aircraft overseas.

Antonov flew the first An-178, a freighter/military transport variant of the An-158 equipped with a rear loading ramp, in May 2015. Commitments for this model made by Azerbaijan's Silk Way Airlines and Saudi Arabia failed to convert into firm orders.

Prior to the Russian invasion, Antonov had a firm order for one An-178 from the Peruvian National Police. In January 2021, the Ukrainian government signed a Memorandum of Understanding covering production of three new aircraft for the Ukrainian Ministry of the Interior. We no longer forecast production of An-178s for these customers.